

PATTERN OF CARDIAC VALVES INVOLVEMENT IN RHEUMATIC HEART DISEASE; A 100 CASE STUDY

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ABSTRACT

Objective: To determine the prevalence of different cardiac valves involvement secondary to Rheumatic Heart Disease (RHD) in our region.

Study Design: Prospective observational study **Setting:** Coronary Care Unit (CCU) and various medical wards Bahawal Victoria Hospital (BVH) Bahawalpur **Study Period:** From Dec 2001 to Dec 2002. **Patients & Methods:** A total of 100 patients regardless of age and sex, fulfilling the selection criteria of RHD were studied in detail according to a specifically designed proforma. The selected patients were further evaluated by echocardiography to see the involvement of different cardiac valves and the results were compiled on percentage basis.

Results: Mitral was the most frequently involved valve. Pure mitral stenosis (MS) was seen in 30 patients (30%), 22 (73.33%) were female and 8 (26.66%) were males, while pure mitral regurgitation (MR) was seen in 12 patients (12%) comprising 7 (58.33%) females and 5 (41.66%) males. Out of 20 patients (20%) with mixed mitral valve disease 11 (55%) were females and 9 (45%) males. Pure aortic regurgitation (AR) was seen in 2 patients (2%), 1 (50%) each for male and female, while pure aortic stenosis (AS) was seen in none. Mixed aortic valve involvement was seen in 2 patients (2%) comprising of 1 (50%) patient each for male and female. Combined mitral and aortic valves were involved in 34 patients (34%) having equal distribution in males and females. **Conclusion:** Combined mitral and aortic valvular lesion is the most frequent pattern of cardiac valvular involvement in RHD, while mitral is the most frequently involved single valve.

Keywords: Rheumatic Heart Disease (RHD), Cardiac valves, Mitral stenosis (MS) Aortic Regurgitation (AR)

INTRODUCTION

Rheumatic heart disease (RHD) is a consequence of Rheumatic Fever (RF), which is an immunological hypersensitivity tissue reaction to a preceding group A streptococcal toxin consequent to infection of throat and pharynx. It results from fibrosis and scarring occurring in chronic healing phase of the disease involving the heart valves, leading to permanent dysfunction. Different valves are involved in different frequencies. Mitral valve alone is affected in 75-80% of cases, combined lesions of aortic and mitral valves occur in 30%, pure lesions are seen rarely¹.

Despite of remarkable reduction in the incidence of RHD in developed countries, it still remains a very significant public health problem in many developing countries especially in lower socioeconomic communities^{2,3}. Where it is attributed to over crowding, malnutrition, lack of education and lack of medical facilities^{4,5} leading to cardiovascular deaths in the first five decades of life.

Since the aforementioned factors are also prevalent in our country, hence this study was conducted to highlight the prevalence of different cardiac valves involvement secondary to RHD in our region.

PATIENTS & METHODS

One hundred patients of valvular heart disease regardless of age and sex admitted in various medical wards and CCU of BVH, Bahawalpur qualifying the following selection criteria for RHD were included in the study.

SELECTION CRITERIA

Patients having authenticated medical record available showing RF in the past along with the involvement of one or more cardiac valves were regarded to be having cardiac valvular involvement due to RHD.

Patients having no authenticated medical record available of RF in the past but having history suggestive of RF which clearly demonstrated at least two of the following major criteria; Carditis, Arthritis, Subcutaneous nodules, erythema marginatum and chorea or one of the above mentioned criteria plus two of the following minor criteria on history or documented proof. Fever, Polyarthralgias, raised ESR, raised C reactive protein and prolonged PR interval on the EGG.

Patients neither having authenticated medical record nor history suggestive of RF, were taken as valvular involvement due to RHD if congenital heart disease, subacute bacterial endocarditis, hypertension, ischemic heart disease, ankylosing spondylitis, syphilitic aortitis and cardiomyopathy were excluded. All cases of RHD were studied in detail for bio data, history and physical examination with special reference to cardiovascular system which were recorded on a specifically designed proforma. The selected patients were further evaluated by echocardiography to see the involvement of different cardiac valves.

RESULTS

Out of hundred patients of RHD, admitted in various medical wards and CCU of Bahawal Victoria Hospital Bahawalpur, the age ranged from 10-70 years mean being 25 years, out of which females were 59 (59%) while males were 41 (41%). The female to male ratio

being 1.43:1. Seventy two patients (72%) presented in their second and third decade of life (Table-I).

Table-I. Age and sex distribution of patients with RHD

| Age group (years) | Total (%) | Females (%) (n=59) | Males (%) (n=41) |
|-------------------|-----------|--------------------|------------------|
| 5-10 | 4 (4) | 3 (3) | 1 (1) |
| 11-20 | 32 (32) | 20 (20) | 12 (12) |
| 21-30 | 40 (40) | 23 (23) | 17 (17) |
| 31-40 | 10 (10) | 6 (6) | 4 (4) |
| 41-50 | 8 (8) | 4 (4) | 4 (4) |
| 51-60 | 4 (4) | 3 (3) | 1 (1) |
| 61-70 | 2 (2) | - | 2 |

Table-II. Pattern of cardiac valves involvement in RHD

| Lesion | No. of Pts | %age |
|-----------------|------------|------|
| Pure MS | 30 | 30 |
| Pure MR | 12 | 12 |
| MS + MR | 20 | 20 |
| Pure AR | 2 | 2 |
| Pure AS | - | - |
| AS + AR | 2 | 2 |
| Mitral + Aortic | 34 | 34 |

MS-Mitral Stenosis, MR-Mitral Regurgitation, AR-Aortic Regurgitation, AS-Aortic stenosis

Amongst the different valvular involvement, mitral was the most frequently involved valve. Pure mitral stenosis was seen in 30 patients (30%) out of which 22 (73.33%) were females and 8 (26.66%) were males (Table II).

Mixed mitral valve disease was seen in 20 patients (20%), comprising of 11 (55%) females and 9 (45.5%) males. Pure aortic regurgitation was seen in 2 patients (2%), out of which 1 (50%) was male and 1 (50%) was female, while pure aortic stenosis was seen in none.

Table-III. Sex distribution of patients with different valvular involvement RHD

| Cardiac lesion | Total | Female (%) | Male (%) |
|-----------------|-------|------------|-----------|
| Pure MS | 30 | 22 (73.33) | 8 (26.66) |
| Pure MR | 12 | 7 (58.33) | 5 (41.66) |
| MS + MR | 20 | 11 (55) | 9 (45) |
| Pure AR | 2 | 1 (50) | 1 (50) |
| Pure AS | - | - | - |
| AS + AR | 2 | 1 (50) | 1 (50) |
| Mitral + Aortic | 34 | 17 (50) | 17 (50) |

MS-Mitral stenosis, MR-Mitral Regurgitation, AR-Aortic Regurgitation
AS-Aortic stenosis

Mixed aortic valve involvement was seen in 2 patients (2%), comprising of 1 (50%) patient each for male and female.

Maximum involvement was that of combined mitral and aortic valves which was seen in 34 patients (34%) in whom there was equal distribution of males and females that is 17 (50%) each, Table-III.

DISCUSSION & CONCLUSION

RHD is not at all uncommon in Pakistan where it is probably responsible for a high degree of morbidity and mortality and has its own financial implications for the individual families.

Statistical record regarding the incidence, age, sex, preponderance and pattern of cardiac valve involvement in RHD is yet to exist in our country and since being quite prevalent there is an urgent need for population based authenticated statistical data showing the incidence of RF and RHD, so that programming can be made on national level regarding the prophylaxis of RF and RHD.

Table-IV. Age distribution of patients with different valvular involvement

| Age in Yrs | Pure MS | Pure MR | MS & MR | AR | AS | AS & AR | Mitral & Aortic | Total |
|--------------|-----------|-----------|-----------|----------|----|----------|-----------------|------------|
| 5-10 | 2 | 1 | 1 | | | | | 4 |
| 11-20 | 8 | 4 | 7 | 1 | | | 12 | 32 |
| 21-30 | 12 | 5 | 9 | 1 | | | 13 | 40 |
| 31-40 | 3 | 1 | 2 | | | | 4 | 10 |
| 41-50 | 2 | | 1 | | | 1 | 4 | 8 |
| 51-60 | 1 | 1 | | | | 1 | 1 | 4 |
| 61-70 | 2 | | | | | | | 2 |
| Total | 30 | 12 | 20 | 2 | | 2 | 34 | 100 |

As far as financial constraints are concerned, almost all the patients i.e. 92% in our study belonged to poor socioeconomic class, residing either in the villages or urban slums, which aggravated the situation since these patients due to lack of proper education and lack of funds were unable to continue with the monthly prophylaxis of RF and once RHD occurred, were unable to continue with proper treatment.

Regarding the sex prevalence the female versus male ratio in our study was 1.43:1; age range varied from 10-50 years with the mean age being 25 years. An almost similar sex preponderance for females i.e. 1.9:1 was noted by Molka A in his study⁸.

As far as pattern of cardiac valve involvement was concerned, pure mitral stenosis was seen in 30% patients in our study, which is comparable to the studies

conducted by Kumar A et al⁹ and Delahaye et al¹⁰ who observed 25% of MS in their respective studies, however a lower incidence of mitral valve involvement was observed by Molka A, who noted mitral stenosis in 21.9% patients. A higher incidence has been reported by Feldman T¹¹ who observed that 40% of the cases of RHD had pure mitral stenosis. Waller BE has pointed out that virtually in all patients the cause of mitral stenosis is previous rheumatic carditis¹².

Pure mitral regurgitation was seen in 12% patients in our study. This is comparable to Selzer A et al¹³ and Waller B et al¹⁵ who observed that 10% patients had rheumatic MR, while slightly higher number was seen by Molka A⁸ who observed pure MR in 18.4%. Chronic rheumatic heart disease is the cause of severe MR in about one third of the cases¹⁶.

Combined lesion of mitral valve that is mixed mitral valve stenosis and regurgitation was seen in 20% patients which is comparable to the observations made by Molka A and Onwachekwa C et al¹⁷.

Pure MR was seen in 2% patients in our study while isolated AS was not seen. Dare AJ et al¹⁸ and Rahimtoola¹⁹ have also observed that AS without accompanying mitral valve disease occurs very rarely on a rheumatic basis.

Combined mitral and aortic valve involvement was seen in 34% patients making it the most frequent pattern of cardiac involvement in our study. This was the most frequent combination of valvular involvement observed by the researchers in studies published as early as 1940. In an autopsy series, combined aortic and mitral valve disease was observed in 33% of 796 patients with RHD²⁰. Similarly, Bland and Jones²¹ followed 699 patients with cardiac involvement due to RF, 99% eventually exhibited aortic and mitral valve disease and it seems since then the most frequent pattern of cardiac valve involvement and it has not changed significantly up till now. Most of the western text published so far has shown almost the same results^{1,2,22}.

RF and RHD are major health problems in our country.

Because of preoccupation with adult cardiac diseases, especially ischemic heart disease (IHD), the problem of RF/RHD has been sidelined and studies on prevalence, treatment, and prevention receive comparatively less attention. Studies are needed on the lines of WHO recommendations, for the regional prevalence of RF/RHD in school children through out the country to detect regional variations. A genetic predisposition to develop RHD appears to be important in our country, but no work to show this has been done yet, so studies, which explore the genetic linkages with RHD, should also be encouraged.

Poor outcomes of RHD are common and are associated with acute RF recurrences, delay in the diagnosis and errors in the secondary prophylaxis. All these lead to early onset of more severe valve lesions as was seen in our study that 72% patients were in the age group of 10-30 years.

The most effective method for control is primary prevention by treating streptococcal sore throat and secondary prevention by early detection and continuous penicillin prophylaxis, because it remains the most practical means of controlling the disease. Intense primary and secondary penicillin prophylaxis should continue to be sharply focused on populations with the highest prevalence of RHD²³. Benzathine penicillin G given as an intramuscular injection at 3 weekly intervals in the dose of 1,200,000 U, remains the treatment of choice for secondary prevention of rheumatic fever. Alternative antibiotics may be used in those allergic to penicillin. An effective and safe vaccine against rheumatic fever is not yet available³.

A coordinated ARF and RHD control program is needed, using a centralized register of patients, if possible, and concentrating on strategies to improve adherence to secondary prophylaxis regimens. This could be done most effectively by general physicians (GP's) who need motivation, education of the patients, their families, health staff and teachers. Schools especially for poor must act as primary and preventive health care centers and in our opinion prevention of RHD starts with school prophylaxis. The quality of care for RF/RHD patients has been

reported to be improved under the school prophylaxis program initiated in 1984 by WHO in close collaboration with the International Society and Federation of Cardiology (ISFC) which included Pakistan, amongst the sixteen other countries of the world, as was also observed by Kumar R et al in their pilot project of RF and RHD²⁴.

Though it seems so simple and attractive on paper, it is not at all an easy task. Poverty, overcrowding, lack of education, poor transport facilities, lack of trained health personnel in the periphery with easy availability of quacks, and very poor follow up add to the problems. However, it still remains a possibility, though a difficult one, to successfully apply a secondary prevention program for control of RF/RHD by using existing health infrastructure in the country.

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